COMMODORE

DISK DRIVE
1570 / 1571

Technical Manual

1	CS	: Low selectiert den Chip
2	R/W	: high schreiben/low lesen
3	AQ	: Diese zwei Eingänge selectieren
4	A1	interne Register CS ist low

A1	A0	R/W=1	R/V = 0
0	0	Status Reg.	Command Reg
0	1	Track Reg.	Track Reg.
1	0	Sector Reg.	Sector Reg.
1	1	Data Reg.	Data Reg

5-12	D0-07	: Acht bit bi-Datenbus (TTL)
13	Reset	: Status Reg. wird aktiviert
14	Masse	
15	+5V	
16	Step	17 Direction
18	clock	: 8MHz ± 1 %
19	read Data	: Low aktiv enthält clock und Datenimpulse von der Drive
20	Motor on	: aktive High (spindle Motor)
21	write Gate	: Daten gültig für Diskette
22	write Data	: MFM Daten auf Disk schreiben
23	Track 00	24 Index Pulse
25	write Protect	: Low verhindert Schreibvorgang
26	Double Dessity enable	: Low double Dessity ist selectiert
27	Data Request	: Output = Datenregister ist voll beim Lesen, leer beim Schreiben
28	Interrupt Request	: Output = wird nach jedem Befehl oder Reset gesetzt = Status Reg. Leser

WD 1770 FDG

wird beim Schreiben/Lesen von der Diskette in MFM Format benutzt

Read/Write Hybrid

Schreib/Lese-Verstärker
Digital-Analog Umwandlung
Steuerung des Steppermotors

Floppy 1571

Allgemeines

Das System arbeitet mit einem 6502 Prozessor, der mit einer Taktfrequenz von 1 oder 2 MHz gespeist wird.

Das DOS ist in einem 32K ROM enthalten. Als Schreib-Lese-Speicher wird ein 2K x 8 statisches RAM benutzt.

Die Ports gleichen denen der 1541

Wenn das System eingeschaltet wird, erscheint es im 1541 Modus. Der Takt hat eine Frequenz von 1 MHz und alle benutzten Controler, und DOS-Routinen gleichen denen des 1541 Modus.

Wenn die Floppy einen schnellen Datentakt auf dem seriellen Bus erkennt, wechselt der Modus zur 1571. In diesem Modus wird der Takt auf 2 MHz erhöht und die Controler und DOS Routinen des 1571-Modus werden benutzt.

GCR Datenübertragung wird in zwei Gate Arrayes (64 H 156, 64H 157) ausgeführt.

MFM Datenübertragung wird vom WD-Controler 1770 ausgeführt. Daten, die im MFM-Mode transportiert werden, werden direkt über den Datenbus zum WD 1770 gesendet.

Inhaltsverzeichnis

A. Allgemeines

B. Schaltpläne

TECHNISCHE DATEN

GCR-Format

	Einseitig	Doppelseitig
Kapazität (unformatiert)	252019 Bytes	252019*2 Bytes
Kapazität (formatiert)	174848 Bytes	349696 Bytes
Maximale Größe einer sequentiellen Datei	168656 Bytes	337312 Bytes
Maximale Größe einer relativen Datei	167132 Bytes	167132 Bytes
Einträge pro Datei	65535	65535
Dateien pro Diskette	144	144
Spuren pro Diskette	35	70
Sektoren pro Spur	17-21	17-21
Sektoren pro Diskette	683 insgesamt 664 frei	1366 insgesamt 1328 frei
Bytes pro Sektor	256	256

MFM-Format

Kapazität (unformatiert):	500000 Bytes pro Seite
Kapazität (formatiert):	
Sektorgröße 128	133120 Bytes pro Seite
Sektorgröße 256	163840 Bytes pro Seite
Sektorgröße 512	184320 Bytes pro Seite
Sektorgröße 1024	204800 Bytes pro Seite
Maximale Anzahl der Spuren	40 pro Seite
Sektoren pro Spur	
Sektorgröße 128	26
Sektorgröße 256	16
Sektorgröße 512	9
Sektorgröße 1024	5

BENUTZTE CHIPS

6502A	Mikroprozessor
6522	
6526	
23256	ROM mit 32K Bytes
4016	RAM mit 2K Bytes
64H156/64H157	Gate Array
R/W-Hybridschaltkreis	Analogschaltung (MFM, GCR)
WDC 1770	Disk-Controller

ABMESSUNGEN

Höhe	76 mm
Breite	216 mm
Tiefe	346 mm
Gewicht	3,5 kg

BETRIEBSDATEN

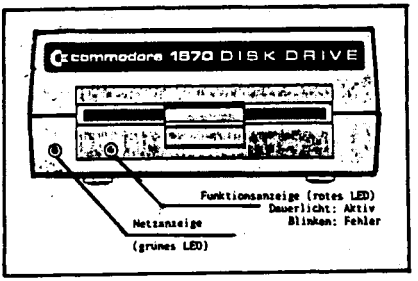
Spannung	220 V Wechselspannung
Frequenz	50 Hz
Leistungsaufnahme	25 W

DATENTRÄGER

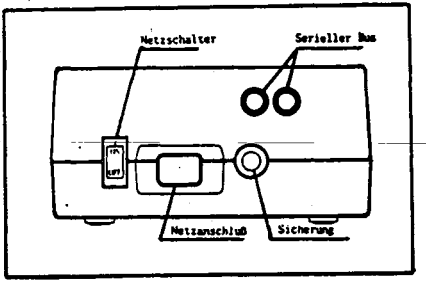
Jede hochwertige 5¼"-Diskette kann benutzt werden. (Die Verwendung von Commodore-Disketten wird empfohlen.)

Unterschiede zur 1571

Die Commodore 1570 Diskettenstation verfügt über ein Laufwerk mit einem Klappenverschluß.



FRONTPLATTE



RÜCKSEITE

Betriebssystem

Die 1570 arbeitet mit dem Commodore DOS, Version 3.0/1570. Eine entsprechende Meldung erhalten Sie unmittelbar nach dem Einschalten bei der Abfrage des Floppyfehlerkanals. ("PRINT DS$" bei BASIC 7.0)

Die 1570 arbeitet im Gegensatz zur 1571 mit nur einem Schreib-/Lesekopf. Alle Angaben im Handbuch der 1571, die sich auf doppelseitig genutzte Disketten beziehen ("doppelseitig", "pro Seite", "1571-Modus" bei BAM, etc.) gelten nicht für die 1570.

Geräteadresse

Die Geräteadresse kann sowohl soft- als auch hardwaremäßig geändert werden. Die softwaremäßige Änderung erfolgt wie im Handbuch der 1571 beschrieben; die DIP-Switches für die hardwaremäßige Umstellung sind nach dem Öffnen des Gehäuses auf der rechten Seite der Leiterplatte über dem Laufwerk zu erreichen. Um Auseinandersetzungen über Garantieansprüche zu vermeiden, sollte ein Umstellen der Schalter nur von einem Commodore-Fachhändler vorgenommen werden.

Technische Daten

Mikroprozessor 6502
2 K RAM
32 K ROM (integriertes DOS)
Serieller Bus, kompatibel zu allen Commodore-Homecomputern.

Diskettenformate:
Commodore Standard (GCR, Single Sided, Single Density)

Speicherkapazität:	170 KB (formatiert)
Spuren pro Diskette:	35
Sektoren pro Spur:	17 bis 21, je nach Lage
Sektoren pro Diskette:	insgesamt 683, 664 frei für den Anwender
Bytes pro Sektor:	256

MFM-Formate:

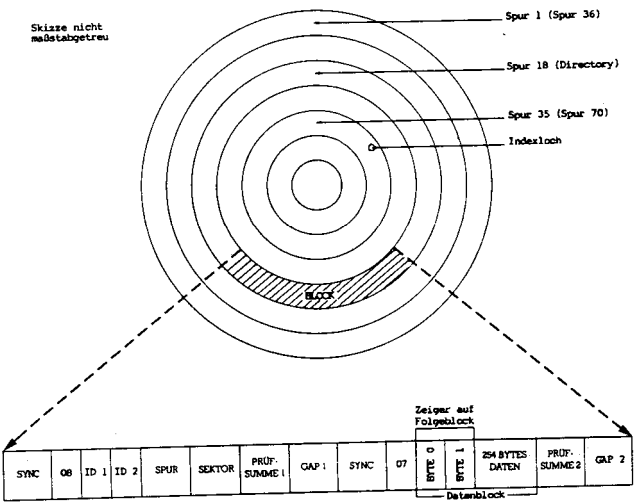
Speicherkapazität:	
- bei 128 Bytes/Sektor:	130 KB
- bei 256 Bytes/Sektor:	160 KB
- bei 512 Bytes/Sektor:	180 KB
- bei 1024 Bytes/Sektor:	200 KB
Spuren pro Diskette:	max. 40
Sektoren/Spur:	
- bei 128 Bytes/Sektor:	26
- bei 256 Bytes/Sektor:	16
- bei 512 Bytes/Sektor:	9
- bei 1024 Bytes/Sektor:	5

Datenträger:
Jede hochwertige 5-1/4-Zoll-Diskette kann verwendet werden. Commodore-Disketten werden empfohlen.

Maße: 97 mm x 200 mm x 374 mm (H x B x T)

Spannungsversorgung: 220 V, 50 Hz
Leistungsaufnahme: 25 W

DISKETTENFORMATE



Die Spuren 36 bis 70 beziehen sich auf zweiseitige Disketten

GCR-formatierte Diskette

Die Pin-Belegung der Buchse für den seriellen Bus geht aus folgender Tabelle hervor:

Pin-Nummer	Signal	Richtung	Beschreibung
Pin 1	SRQ (Serviceanforderung)	I/O	Wird vom schnellen seriellen Bus als schnelle Taktleitung in beiden Richtungen benutzt. Wird von dem langsamen seriellen Bus nicht verwendet.
Pin 2	GND (Erde)	I	Masse
Pin 3	ATN	I/O	Der Rechner setzt dieses Signal auf den Logikpegel Low und löst damit einen Interrupt auf der Steuerplatine aus. Daraufhin wird die Geräteadresse auf der Datenleitung gesendet. Antwortet keines der angeschlossenen Peripheriegeräte daraufhin innerhalb einer bestimmten vorgegebenen Zeit, so geht der Sender (Rechner) davon aus, daß das adressierte Gerät nicht am Bus angeschlossen ist.
Pin 4	CLK (Takt)	I/O	Dieses Signal wird für die zeitliche Steuerung der Daten benutzt, die auf dem langsamen seriellen Bus gesendet werden (Softwaretakt).
Pin 5	DATA	I/O	Die Daten auf dem seriellen Bus werden softwaremäßig getaktet Bit für Bit übertragen.
Pin 6	RESET		Dieses Signal bewirkt einen RESET des Peripheriegerätes nach einem RESET des Rechners.

Format von Spur und Sektor

Spuren	Vorhandene Sektoren	Anzahl der Sektoren		
1 bis 17	0 bis 20	21	1541-Modus	1571-Modus
18 bis 24	0 bis 18	19		
25 bis 30	0 bis 17	18		
31 bis 35	0 bis 16	17		
36 bis 52	0 bis 20	21		
53 bis 59	0 bis 18	19		
60 bis 65	0 bis 17	18		
66 bis 70	0 bis 16	17		

ÄNDERUNG DER GERÄTEADRESSE

Hardware-Methode

Mit zwei DIP-Switches auf der Rückseite der 1571 kann die Geräteadresse der 1571 geändert werden. Mit einem Schraubenzieher, Bleistift oder einem anderen kleinen Werkzeug können die Schalter entsprechend eingestellt werden. In der folgenden Tabelle werden die für jede Geräteadresse erforderlichen Einstellungen angegeben.

Links	Rechts	Geräteadresse
Oben	Oben	8
Unten	Oben	9
Oben	Unten	10
Unten	Unten	11

TABELLE DER DISKETTENBEFEHLE

BASIC 2.0

Allgemeines Format: OPEN 15,8,15:PRINT#15,befehl:CLOSE 15

VERWALTUNGSBEFEHLE

BASIC 2.0	NEW	"N0:diskettenname,id"
	COPY	"C0:neue datei=0:alte datei"
	RENAME	"R0:neuer name=alter name"
	SCRATCH	"S0:dateiname"
	VALIDATE	"V0"
BASIC 7.0	NEW	HEADER "diskettenname",id,D0
(BASIC 3.5)	COPY	COPY "alte datei" TO "neue datei"
	RENAME	RENAME "alter name" TO "neuer name"
	SCRATCH	SCRATCH "dateiname"
	VALIDATE	COLLECT
BASIC 2.0, 3.5, 7.0	INITIALIZE	"I0"

DATEIBEFEHLE

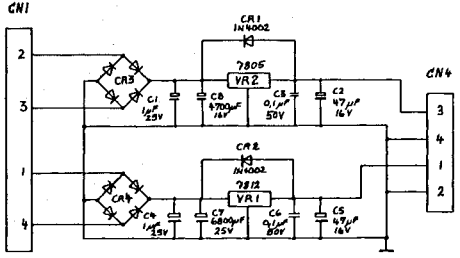
BASIC 2.0	LOAD	LOAD "dateiname",8
	SAVE	SAVE "dateiname",8
	VERIFY	VERIFY "dateiname",8
BASIC 7.0/3.5	LOAD	DLOAD "dateiname"
	SAVE	SAVE "dateiname"
	VERIFY	DVERIFY "dateiname" (nur BASIC 7.0)
Binärdatei (nur BASIC 7.0)	BLOAD	BLOAD "dateiname",Bbank,Pstartadresse
	BSAVE	BSAVE "dateiname",Bbank,Pstartadresse TO endadresse+1
	BOOT	BOOT "dateiname"
	OPEN	DOPEN#datei#,"dateiname" [,Leintragslänge] [,W]
	CLOSE	DCLOSE#datei
	RECORD#	RECORD#,datei,eintragsnummer [,offset]

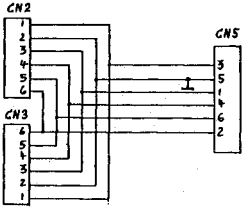
BASIC 2.0, 3.5, 7.0	OPEN	OPENdatei,gerät,kanal,"0:dateiname,dateityp, richtung"
	CLOSE	CLOSEdatei
	RECORD#	"P" + CHR$(kanal)+CHR$(<eintrag) + CHR$(>eintrag)+CHR$(offset)
	PRINT#	PRINT#datei,datenliste
	GET#	GET#datei,variablenliste
	INPUT#	INPUT#datei,variablenliste

BEFEHLE FÜR DEN DIREKTZUGRIFF

BLOCK-ALLOCATE	"B-A";0;spur#;sektor#
BLOCK-EXECUTE	"B-E";kanal#;0;spur#;sektor#
BLOCK-FREE	"B-F";0;spur#;sektor#
BUFFER-POINTER	"B-P";kanal#;byte
BLOCK-READ	"U1";kanal#;0;spur;sektor#
BLOCK-WRITE	"U2";kanal#;0;spur#;sektor#
MEMORY-EXECUTE	"M-E"CHR$(<adresse)CHR$(>adresse)
MEMORY-READ	"M-R"CHR$(<adresse)CHR$(>adresse)CHR$(anzahl)
MEMORY-WRITE	"M-W"CHR$(<adresse)CHR$(>adresse)CHR$(anzahl)CHR$ (datenbyte)CHR$(datenbyte)...
USER	"Uzeichen"
UTILITY LOADER	"&0:dateiname"

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
Ø		ADVANCED ENGINEERING RELEASE		
A		PRODUCTION RELEASE		





UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .X ±.1 .XX ±.05 .XXX ±.010 ∠ ±1°	DRAWN BY: Angeluk	DATE 9-2-85	commodore
	CHKD: [illegible]	9-2-85	SCHEMATIC
	ENGR:		POWER SUPPLY 1570
	APPR:		
MATERIAL: /	USED ON	NEXT ASSY	SIZE B 325 118 REV A
FINISH: /	1570		SCALE NONE SHEET 1 OF 1

COMMODORE MODEL 1571

SINGLE DISK DRIVE

PRELIMINARY

DIAGNOSTIC MANUAL

VERSION VP-3.1

SEPTEMBER 19, 1985

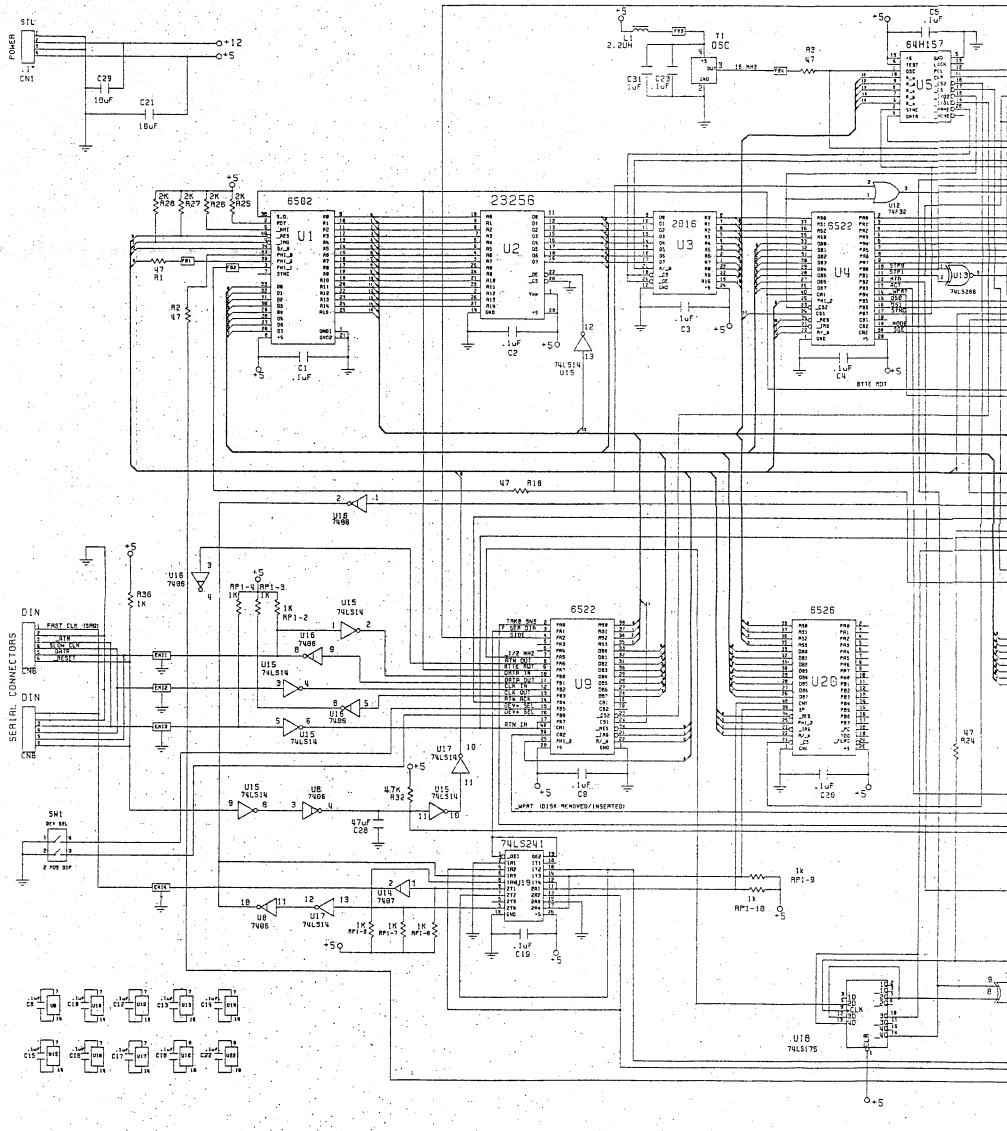
VERSION VP-1.3 TEST DISKETTE INTRODUCTION

```
**********************************************************************
**                                                                  **
**                                                                  **
**   THIS MANUAL ALONG WITH THE TESTS ARE A PRELIMINARY VERSION. WHEN FINAL  **
**   TESTS ARE COMPLETED THEY WILL BE RELEASED ALONG WITH THE FINAL MANUAL    **
**                                                                  **
**                                                                  **
**********************************************************************
```

The below listing is the directory of the Version VP-1.3 Test Diskette and a brief explanation of each program. More detailed information is contained inside this manual.

Disk Name -- 1571 Test VP-1.3

```
PGM  1 - "Menu VP-1.3"        ** Diagnostic Test Menu for 1571 Test VP-1.3 Disk
PGM  2 - "Performance Bin"    ** Binary File loaded prior to Performance Test
PGM  3 - "Performance Test"   ** Performance Read/Write Test for the 1571
PGM  4 - "Read/Write Bin"     ** Binary File loaded prior to Read/Write Test
PGM  5 - "Read/Write Test"    ** Read/Write Test for the 1571
PGM  6 - "System Test Bin1"   ** Binary File loaded prior to the System Test
PGM  7 - "System Test Bin2"   ** Binary File loaded prior to the System Test
PGM  8 - "System Test"        ** System Test for the 1571
PGM  9 - "Final Test Bin"     ** Binary File loaded prior to the Final Test
PGM 10 - "Final Test"         ** Final Test for the 1571
PGM 11 - "R/W Burn-in"        ** Extended Read/Write Test for the 1571
PGM 12 - "Alignment Inst"     ** Instructions to run the Alignment Test
PGM 13 - "Alignment Test"     ** Alignment Test - C-64/1541 Mode Only
```


STL
POWER
CN1
C29
10uF
C21
10uF
+12
+5
L1
2.2UH
Y1
OSC
C31
.1uF
C23
.1uF
R2
47
64H157
U5
C5
.1uF
6502
U1
23256
U2
2016
U3
6522
U4
74F32
U12
74LS266
U13
BYTE RDY
R1
47
R2
47
C1
.1uF
C2
.1uF
74LS14
U15
C3
.1uF
C4
.1uF
U7
R18
U18
7406
U16
7406
R36
1K
RP1-4
RP1-3
RP1-2
RP1-1
U15
74LS14
U16
7406
U15
74LS14
U16
7406
U17
74LS14
U9
6522
U20
6526
U7
R24
C20
.1uF
C9
.1uF
WPRT (DISK REMOVED/INSERTED)
DIN
SERIAL CONNECTORS
FAST CLK (SMD)
DIN
SLOW CLK
DATA
RESET
CN6
DIN
CN6
SW1
DPY SEL
2 POS DIP
U15
74LS14
U8
7406
47K
R32
47uF
C28
U15
74LS14
74LS241
U19
U14
7407
U8
7406
U17
74LS14
1K
RP1-5
1K
RP1-7
1K
RP1-6
C19
.1uF
1K
RP1-9
1K
RP1-10
U18
74LS175
C6
C5
C10
C9
C13
C12
C16
C15
C15
R15
C18
R14
C17
R13
C21
R12
C22
R11
R10

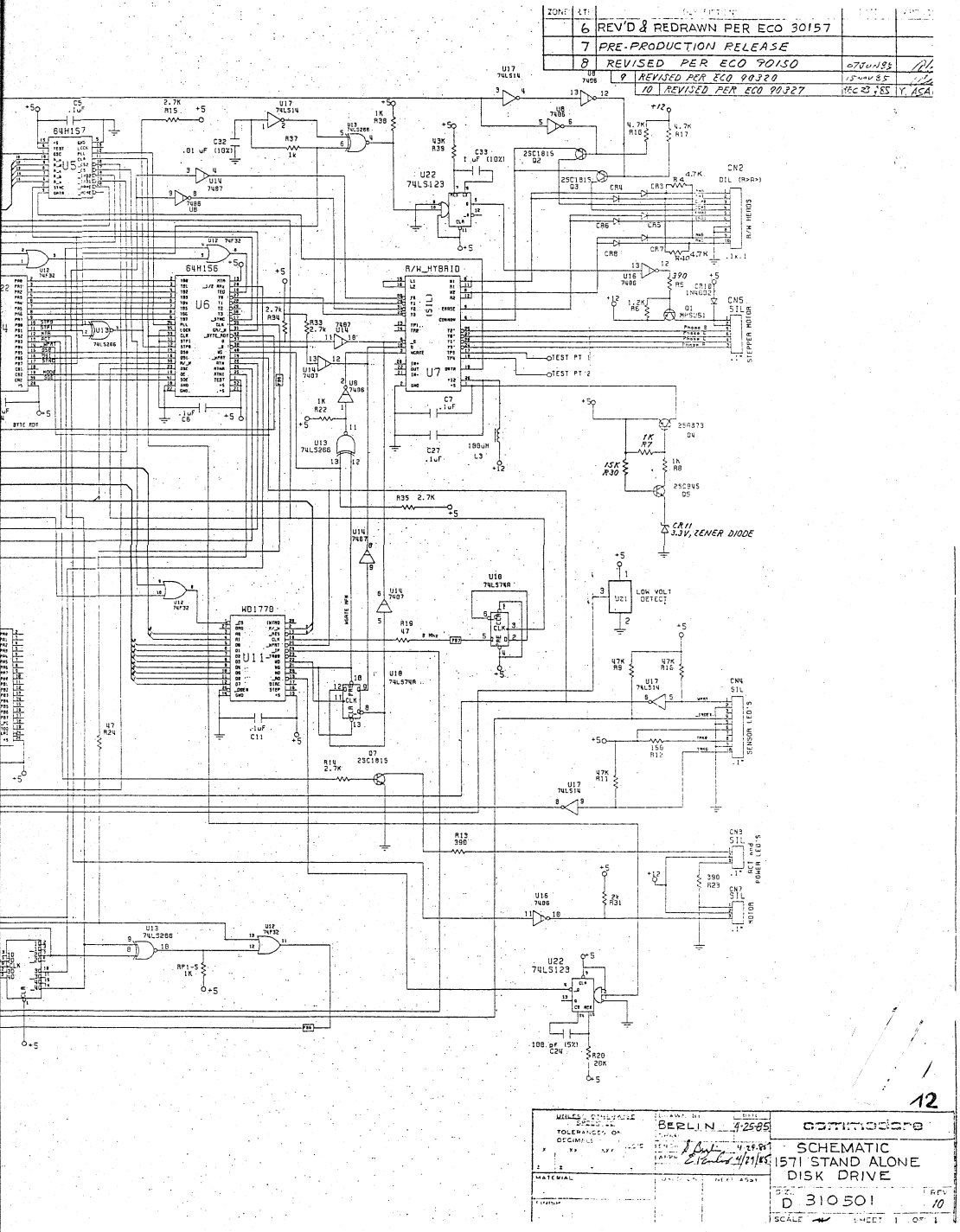

ZONE LT:
6 REV'D & REDRAWN PER ECO 30157
7 PRE-PRODUCTION RELEASE
8 REVISED PER ECO 90150 07JUN83
9 REVISED PER ECO 90320 15JUN85
10 REVISED PER ECO 90327 DEC 23 '85 Y. ACA
64H157
64H156
WD1770
R/W_HYBRID
U22 74LS123
U17 74LS14
U16 7406
U14 7407
U13 74LS266
U12 74F32
U8 7406
U18 74LS74A
U21 LOW VOLT DETECT
CN2 DIL (RSRS) R/W HEADS
CN5 STEPPER MOTOR
CN4 SEKSON LED'S
CN3 HDC and POWER LED'S
CN7 MOTOR
TEST PT 1
TEST PT 2
CR11 3.3V, ZENER DIODE
Q1 MPSU51
Q2 2SC1815
Q3 2SC1815
Q4 2SB873
Q5 2SC945
BERLIN 4-25-85
SCHEMATIC
1571 STAND ALONE
DISK DRIVE
D 310501
REV 10
SCALE
SHEET 1 OF 1

TABLE OF CONTENTS

MENU VP-1.3

DESIGNED TO AUTO-BOOT THE DIAGNOSTIC TESTS

REQUIRED EQUIPMENT C-128 COMPUTER
1571 SINGLE DISK DRIVE
40, 80 COLUMN MONITOR OR TV SET
VERSION VP-1.3 TEST DISKETTE

****
** **
** YOU MUST USE DOUBLE SIDED - DOUBLE DENSITY DISKETTES FOR ALL TESTS **
** **
****

To load the diagnostic menu the following steps must be implemented..

1. Insert Test Disk Version VP-1.3 Into the 1571
2. Hold Down the 'SHIFT KEY' and Press the 'RUN/STOP KEY'

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection is made the following option menu is displayed..

1. Press '1' - To Load The Performance Test -- See Pages 2-1 thru 2-2
2. Press '2' - To Load The Read/Write Test -- See Pages 3-1 thru 3-2
3. Press '3' - To Load The System Test -- See Pages 4-1 thru 4-3
4. Press '4' - To Load The Final Test -- See Pages 5-1 thru 5-2
5. Press '5' - To Load The Logic Diagnostic -- See Page 6-1
6. Press '6' - To Load The Read/Write Burn-in -- See Pages 7-1 thru 7-2
7. Press '7' - To Load The Alignment Inst -- See Page 8-1

PERFORMANCE TEST

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT
C-128 COMPUTER
1571 SINGLE DISK DRIVE
40, 80 COLUMN MONITOR OR TV SET
(1) FORMATTED OR BLANK DISKETTE
VERSION VP-1.3 TEST DISKETTE

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection has been made the following must be selected..

1. Press 'F' if the diskette being used for the test is already formatted
2. Press 'U' if the diskette being used for the test is not formatted

If the 'F' (FORMATTED) option was selected..

1. Insert Formatted Diskette
2. Press 'SPACE' to begin the test
3. A Quick Format command is executed
   * Only the Header is written to the diskette

If the 'U' (UNFORMATTED) option was selected..

1. Insert Blank Diskette
2. Press 'SPACE' to begin the test
3. A Long Format command is executed
   * All Tracks are formatted with an ID written to all Sectors

When the Format option is complete the following tests are executed..

1. A file is Opened - A Data File is written - The file is Closed
2. A file is Opened, The Data File is read and verified - The file is Closed
3. The Data File is Scratched from the diskette

The 1541 Slow Mode is checked by..

1. Writing Data to tracks 5 and 35
2. Reading and Verifying written data from tracks 35 and 5

The 1571 Fast Mode is checked by..

1. Writing Data to tracks 40 and 70
2. Reading and Verifying written data from tracks 70 and 40

The MFM Burst Format is checked by formatting..

TRACK	BYTES/SECTOR
1	128
2	512
36	1024
37	256
38	512
39	128

The Burst Read/Write is checked by Writing, Reading and Comparing Data on..

Tracks -- 01,02,36,37,38,39 -- Side 0
Tracks -- 79,78,77,76,42,41 -- Side 1

** A Failure during Burst Operations is normally due to a Bad Diskette or a Double Sided - Double Density Diskette not being used

READ/WRITE TEST

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT C-128 COMPUTER
1571 SINGLE DISK DRIVE
40, 80 COLUMN MONITOR OR TV SET
(1) FORMATTED DISKETTE
VERSION VP-1.3 TEST DISKETTE

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection has been made the instructions are displayed..

1. Remove Diagnostic Diskette
2. Insert Formatted Diskette
3. Press 'RETURN' to begin the test

The MFM Format is checked by formatting..

TRACKS	BYTES/SECTOR
00-09	128
10-19	256
20-29	512
30-39	1024

The Read/Write Operation is checked by..

1. Randomly Writing data to tracks 0-39
2. Randomly Reading data from tracks 0-39

SYSTEM TEST

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT
C-128 COMPUTER
1571 SINGLE DISK DRIVE (DEVICE 8)
1571 SINGLE DISK DRIBE (DEVICE 9) — OPTIONAL
40, 80 COLUMN MONITOR OR TV SET
(1) FORMATTED (WRITE-PROTECTED) DISKETTE
(1) BLANK DISKETTE
VERSION VP-1.3 TEST DISKETTE

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection has been made the instructions are displayed..

1. Insert Formatted - Write Protected Diskette
2. Press 'SPACE' to begin test

Zero Track is checked by executing a five (5) count loop to zero track and reading a pre-written sync mark on the diskette

Write Protect is checked by attempting to format the write-protected diskette and reading back the error channel

When the 'Activity LED Blinking Rapidly' prompt is displayed..

1. Press 'F3' if LED is not rapidly blinking
   * SYSTEM FAILS - Bad Write-Protect Sensor
2. Press 'F1' if LED is rapidly blinking
   * The Bump Test is Downloaded

The Head Bump checks Track 1 by bumping the head against the Zero Stop five (5) times and checking that the head comes back on track

When all above tests have passed the instructions are displayed..

1. Remove Write-Protected diskette
2. Insert Blank Disk
3. Press 'SPACE' to continue test

Format Operation is checked by executing a GCR Format to all tracks with an ID written to all sectors

When the GCR Format is complete the following tests are executed..

1. A file is Opened - A Data File is Written - File is Closed
2. A file is Opened - The Data File is Read and Verified - File is Closed
3. The Data File is Scratched

The 1541 Slow Mode is checked by..

1. Writing data to tracks 5,15,25,35
2. Reading and Verifying written data from tracks 35,25,15,5

The 1571 Fast Mode is checked by..

1. Writing data to tracks 40,50,60,70
2. Reading and Verifying written data from tracks 70,60,50,40

The MFM Burst Format is checked by formatting..

TRACK	BYTES/SECTOR
1	128
2	512
36	1024
37	256
38	512
39	128

The Burst Read/Write is checked by Writing, Reading and Comparing Data on..

Tracks 01,02,36,37,38,39 -- Side 0
Tracks 79,78,77,76,42,41 -- Side 1

When the Burst Operations are complete the following instructions should be followed..

1. Remove disk from device (8)
2. Insert in device (9)
3. Press 'R' if no device (9) is present
   * Skips Compatibility Test
4. Press 'SPACE' to begin compatibility test

The 1541 Slow Mode Compatibility is tested by..

1. Reading and Verifying data from tracks 5,15,25,35

The 1571 Fast Mode Compatibility is tested by..

1. Reading and Verifying data from tracks 40,50,60,70

Burst Read Compatibility is checked by Reading and Verifying Data from..

Tracks - 01,02,36,37,38,39 -- Side 0
Tracks - 79,78,77,76,42,41 -- Side 1

FINAL TEST

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT
C-128 COMPUTER
1571 SINGLE DISK DRIVE (DEVICE 8)
1571 SINGLE DISK DRIBE (DEVICE 9) — OPTIONAL
40, 80 COLUMN MONITOR OR TV SET
(1) FORMATTED DISKETTE
(1) BLANK DISKETTE
VERSION VP-1.3 TEST DISKETTE

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection has been made the option menu is displayed..

1. Press '1' to select Format Option
2. Press '2' to select Read/Write Option
3. Press '3' to display Test Results - After Read/Write Test is complete
4. Press 'A' to execute all the listed options

If '1' is selected - The MFM Format is checked by formatting..

TRACKS	BYTES/SECTOR
00-09	128
10-19	256
20-29	512
30-39	1024

If '2' is selected - The Read/Write Test is downloaded to the 1571

** When the download is complete the Read/Write Test executes entirely from DOS and the 1571 may be disconnected

** If the 'A' (All Options) is selected do not disconnect the 1571

Press 'C' if the C-128 is disconnected
Press 'R' to return to the option menu

If '3' is selected - The test results are displayed in the following format..

FIRST PASS ERRORS - Displays errors per track for the first test pass

SECOND PASS ERRORS - Displays errors per track for the second test pass

RETRY ERROR COUNT - Displays number of necessary retries

ERROR TYPE - Displays types of errors encountered..

CRC - Data CRC Error
RNF - Retry Count Not Found
ADM - Address Mark Not Found

When all test results are displayed..

1. Press 'R' to restart the test
2. Press 'E' to exit from test

LOGIC DIAGNOSTIC

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT C-128 COMPUTER
1571 SINGLE DISK DRIVE
40, 80 COLUMN MONITOR OR TV SET
VERSION VP-1.3 TEST DISKETTE

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection has been made instructions are displayed..

1. Connect 1571 to be tested to the C-128
2. Apply Power to the 1571
3. Press 'F1' to begin testing

** A diskette is not needed for this test

When 'F1' has been pressed the Logic Diagnostic Code is downloaded to the 1571

When the download is complete an Activity LED Blinking prompt is displayed..

1. Press 'F3' if LED is not blinking
   * Download has failed — Reset 1571 and retry download

2. Press 'F1' if LED is blinking

If 'F1' has been selected an error flash code chart is displayed. The status of the 1571 logic is indicated by short blinks of the activity LED followed by a long time interval per the following chart..

1 - FLASH — LOGIC IS OK
2 - FLASHES — REPLACE DOS ROM — PCB LOCATION U02
3 - FLASHES — REPLACE RAM IC — PCB LOCATION U03
4 - FLASHES — REPLACE 6522 IC — PCB LOCATION U04
5 - FLASHES — REPLACE 6522 IC — PCB LOCATION U09
6 - FLASHES — REPLACE 6526 IC — PCB LOCATION U20
7 - FLASHES — REPLACE WD1770 — PCB LOCATION U11

When the download is complete the Logic Diagnostic is executing entirely from the 1571 DOS and the C-128 may be disconnected.

Press 'F1' to test more drives
Press 'F3' to exit from the test

** Once the Logic Diagnostic has been downloaded to a 1571 it is necessary to reset (Turn Off and On) the 1571 before it can be accessed.

READ/WRITE BURN-IN

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT C-128 COMPUTER
1571 SINGLE DISK DRIVE
40, 80 COLUMN MONITOR OR TV SET
(1) FORMATTED OR BLANK DISKETTE
VERSION VP-1.3 TEST DISKETTE

When the program is loaded select the following..

1. Press '4' if you are using a 40 column monitor or a TV set
2. Press '8' if you are using a 80 column monitor

When the monitor selection has been made the option menu is displayed..

1. Press 'F' to select the fast test
2. Press 'S' to select the slow test

When the type of test has been selected the following options are offered..

1. Select the speed mode of the test

   A. Press '1' to run the test in the 1 MHZ Mode
   B. Press '2' to run the test in the 2 MHZ Mode
      * An 80 Column Monitor is required for 2 MHZ Mode

2. Select drive mode of the test

   A. Press '4' to run the test in the 1541 Mode
   B. Press '7' to run the test in the 1571 Mode

3. Select number of passes the test is to run
   * For extensive testing, 10 Passes is suggested for the Fast Test
   * For extensive testing, 2 Passes is suggested for the Slow Test

The format operation of the drive is checked by..

1. MFM Format at 128, 256, 512 and 1024 Bytes/Sector
   * MFM Format is done in the 1571 Mode only

2. GCR Format writing a header only with no ID written - Fast Test
   GCR Format of all tracks with an ID written to all sectors - Slow Test
   * GCR Format is done in both 1541 and 1571 Modes

The write operation of the drive is checked by..

1. Three (3) files are saved to the diskette
   * The files are saved in both 1541 and 1571 Modes

The write operation is verified by..

1. Reading the directory to ensure the three (3) files were properly saved

The Read/Write Operation of the drive is tested by..

1. Reading - Writing - Reading and Verifying - per the following..

Fast Test - 1541 Mode - Tracks - 01,05,10,15,20,25,30,35
Sectors - 00,08,16

Slow Test - 1541 Mode - Tracks - 01 thru 35
Sectors - 00 thru 16

Fast Test - 1571 Mode - Tracks - 01,10,20,30,40,50,60,70
Sectors - 00,08,16

Slow Test - 1571 Mode - Tracks - 01 thru 70
Sectors - 00 thru 16

The test results are displayed at the end of the test in the following format..

PASSES - Total number of passes run
TOTAL ERRORS - Total errors encountered during all operations

The error list displays all errors on a per operation basis as..

MFM 128 BYTE - Number of errors encountered during the 128 Byte/Sector MFM Format Operation

MFM 256 BYTE - Number of errors encountered during the 256 Byte/Sector MFM Format Operation

MFM 512 BYTE - Number of errors encountered during the 512 Byte/Sector MFM Format Operation

MFM 1024 BYTE - Number of errors encountered during the 1024 Byte/Sector MFM Format Operation

GCR FORMAT - Number of errors encountered during the GCR Standard Format Operation

FILE SAVE - Number of errors encountered during the Saving File Operation

DIRECTORY - Number of errors encountered during the Directory Read Operation

READ - Number of errors encountered during the Read Operation
* Includes both Read and Read and Verify Operations

WRITE - Number of errors encountered during the Write Operation

COUNTABLE - Number of Read and Write errors that required more than one (1) retry to recover

TOTAL RUN TIME - Total elapsed time since test started

BOTTOM LINE * - Final determination if the system Passes or Fails the test

ALIGNMENT TEST

DESIGNED TO TEST THE 1571 SINGLE DISK DRIVE

REQUIRED EQUIPMENT
C-128 COMPUTER
1571 SINGLE DISK DRIVE
40, 80 COLUMN MONITOR OR TV SET
(1) ALIGNMENT DISKETTE (CBM P/N 970016-01)
(1) FORMATTED DISKETTE
VERSION VP-1.3 TEST DISKETTE

****
**
** THIS VERSION OF THE ALIGNMENT TEST MUST BE LOADED AND RUN **
** WITH THE C-128 IN THE C-64 MODE AND THE 1571 IN THE 1541 MODE **
**
****

When the program is run the following options are availiable..

1. Press 'SPACE' to run all availiable tests
   * This is the recommended option

2. Press '1' to test for proper drive LED operation (Green Activity LED)

3. Press '2' to test for proper Write Protect Sensor operation

4. Press '3' to check Drive Belt status and display the current Motor Speed
   * The speed is out-of-tollerance if the indicated reading is different than (-1ms, 0ms or +1ms)
   * If the speed is out of the recommended tollerance adjustment is allowed

5. Press '5' to monitor the 'CATS EYE SIGNAL' for eveness, correct amplitude and adjust if necessary.
   * Rotate the Stepper Motor to obtain maximum display per Figure 1-1 & 1-2
   * This option requires a special 48TPI alignment disk (CBM P/N 970016-03)

A dual trace scope, with external sync capabilities, will be necessary for proper alignment. The probes must be connected as follows..

PROBE 1 - Pin 17 - IC U7 ------ TP1
PROBE 2 - Pin 18 - IC U7 ------ TP2
EXT SYNC - Pin 17 - IC U6

** Scope settings should be adjusted for the best possible display of the 'CATS EYE SIGNAL'

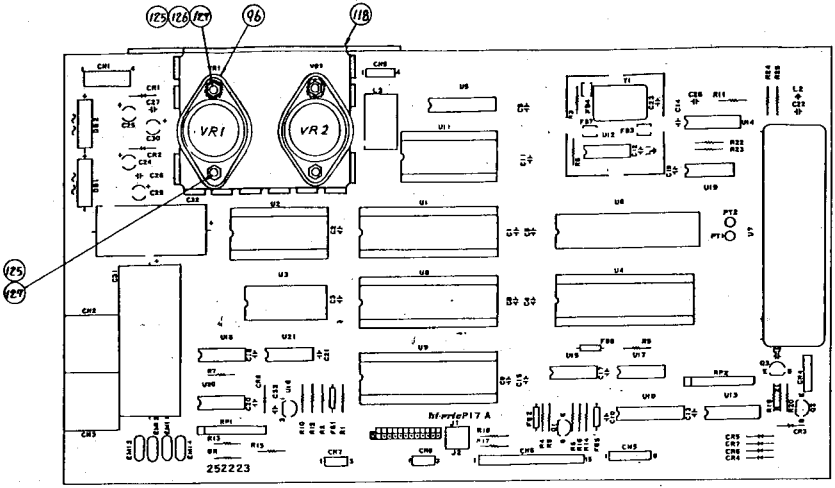
6. Press '6' to do a final Read/Write test on the 1571
   * This test reads, writes and verifies data to random tracks
   * A known good formatted diskette must be used for the Read/Write test

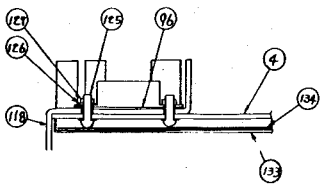
PCB ASSY SINGLE FLOPPY 1570

Artikel-Nr.	Beschreibung	
252 223-01	PCB SINGLE FLOPPY 1570	
901 435-02	IC 6502 AD 2 MHz CPU	U1
252 242-01	23256 32K x 8 ROM	U2
251 828-01	64H156 CUSTOM GATE ARRAY	U6
251 829-01	64H157 CUSTOM GATE ARRAY	U5
251 853-01	R/W HYBRID	U7
310 651-01	WD-1770 FDC	U11
390 077-01	74F 32	U17
310 653-01	65SC 22A (2MHz)	U4,9
318 011-02	6526 A (2MHz)	U8
251 637-05	2016 (S RAM)	U3
251 853-02	R/W HYBRID	U7
251 828-02	CUSTOM GATE ARRAY	U6
251 637-03	2016 (S RAM 120 ns)	U3
251 637-04	2016 (S RAM 150 ns)	U3
325 566-01	CRYSTAL MODULE 16MHz	Y1
902 410-10	RESISTOR PACK 1 Kn 10PIN	PR1
902 410-12	RESISTOR PACK 2.7 Kn 10PIN	PR2
252 173-01	FERRITE BEADS	FB 3,4,7
251 842-02	EMI FILTER 100pF	EMI 1-4
325 505-02	DIODE ZENER 3.3V 500mW	CR 3
252 239-01	DIODE, SILICONE 1A F/4A	CR 1,2,4-7
325 513-01	COIL INDUCTOR 2.2 uH	L1
325 513-03	COIL INDUCTOR 100 uH	L2
251 878-02	LINE FILTER	L3

325 551-01	INSLTATION SILICONE TO-3	VRI.2
325 562-06	HEADER ASSY 3.96 PITCH 6 PIN	CN 5
325 562-15	" 15 PIN	CN 6
325 562-03	" 3 PIN	CN 7. 8
251 065-05	HEADER ASSY 2.5 PITCH 5 PIN	CN 4
252 166-01	CONNECTOR 6 PIN DIN	CN 2. 3
252 233-01	SHIELD PLATE, BOTTOM	
252 234-01	INSULTATION SHEET, 1570	

REVISIONS				
LTR	ZONE	DESCRIPTION	E.C.	APPROVED
		SEE SHEET 1		





UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .XX .XXX ANGLES ±	DRAWN BY: A. Kobayashi	DATE 9-12-84	commodore
	CHKD:		PCB ASSY, SINGLE FLOPPY 1570
	ENGR: S. Tatsuyama	9-21-84	
	APPR:		
MATERIAL:	USED ON: 1570	NEXT ASSY: 250782	SIZE B — 250463 — REV 2
FINISH:			SCALE NONE — SHEET 1 OF 1

ERSATZTEILE 1571

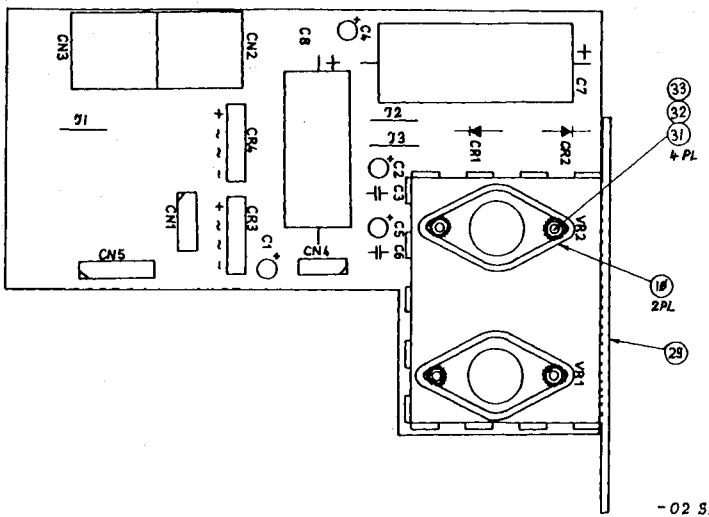
Artikel-Nr.	Beschreibung	
250 771-02	BOTTM CASE ASSY, 1571	Ger/UK
252 050-01	KNOB FOR NEWTRONICS & ALPS	
250 770-01	BEZEL ASSY, 1571	
255 052-04	LABEL RATING, 1571	VDE
BOTTOM CASE ASSY		
D 310 509-01	BOTTOM CASE, 1571	
250 772-02	POWER SUPPLY ASSY, 1571	
310 420-01	PCB ASSY,1571	
252 069-01	SHIELD PLATE, BOTTOM	
252 070-01	INSULATION SHEET A	
252 160-01	SHEET COVER,IC	
252 083-01	FLOPPY DISK, NEWTRONICS	
252 092-01	FLOPPY DISK, ALPS	
310 513-01	DISK DRIVE CHASSIS	
252 165-01	DISK DRIVE CHASSIS ALPS	
PCB ASSEMBLY 1571 STAND ALONE DISK DRIVE		
901 435-02	IC 6502A 2MHZ CPU	U1
310 654-01	23256 32K + 8 ROM	U2
251 828-01	64H156 CUSTOM GATE ARRAY	U6
251 829-01	64H157 CUSTOM GATE ARRAY	U5
251 853-01	R/W HYBRID	U7
310 651-01	WD 1770-00 FDC	U11
390 077-01	74F32 QUAD OR	U12
310 653-01	65SC22A (2MHZ)	U4,9
252 034-02	PST 520D VOLT DET	U21

318 011-03	650 (2MHZ)	U20
251 637-05	2016 20LB 2Kx8	U3
251 828-02	Custom GAZE ARRA	U6
325 566-01	CRYSTAL MODULE 16MHZ	Y1
310 657-01	TRANSISTOR MPSU51 PNP	Q1

PCB ASSEMBLY 1571
STAND ALONE DISK DRIVE

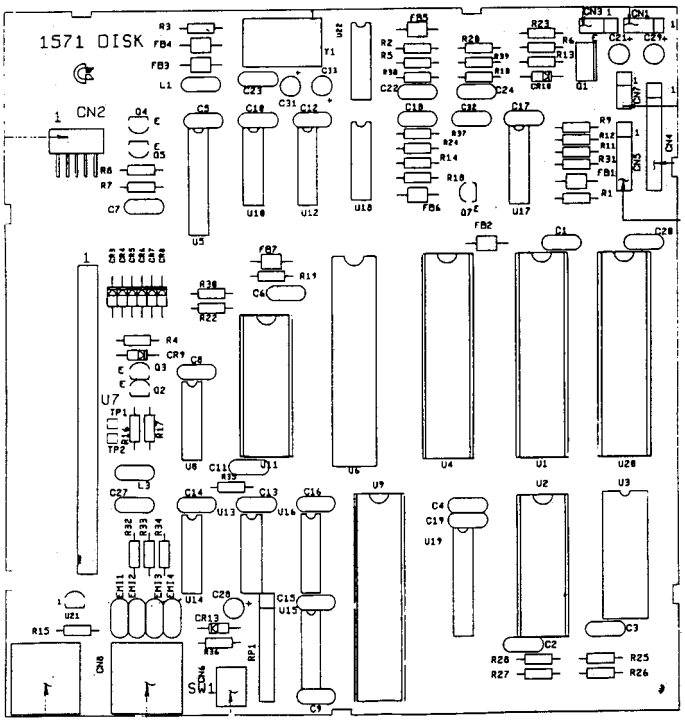
902 410-10	RESISTOR PACK 1 K 10 PIN	RP1
251 842-02	EMI FILTERS 100 PF	EM1-4
325 513-01	INDUCTOR 2.2 MHZ	L1
325 513-03	INDUCTOR 100 MHZ	L3
252 166-01	CONNECTOR 6 PIN DIN	CN6,8
252 145-10	CONNECTOR 10 PIN DUAL RT ANG CNZ	

REVISIONS				
LTR	ZONE	DESCRIPTION	DA	APPROVED
		SEE SHEET 1		



-02 SHOWN

UNLESS OTHERWISE SPECIFIED TOLERANCES ON DECIMALS .X ±.1 .XX ±.05 .XXX ±.010 ∠ ±5°	DRAWN BY D. [illegible]	DATE 10-19-84	commodore
	CHKD M. Hayes	10-19-84	PCB ASSY POWER SUPPLY 1570
	ENGR		
	APPR		
MATERIAL /	USED ON 1570	NEXT ASSY	SIZE B 325117 REV A
FINISH /			SCALE NONE SHEET 4 OF 4


1571 DISK
CN2
CN1
CN3
CN4
CN5
CN6
CN7
CN8
CN9
SW1
U1
U2
U3
U4
U5
U6
U7
U8
U9
U10
U11
U12
U13
U14
U15
U16
U17
U18
U19
U21
U28
Y1
Q1
Q2
Q3
Q4
Q5
Q7
CR9
CR13
RP1
TP1
TP2

COMMODORE

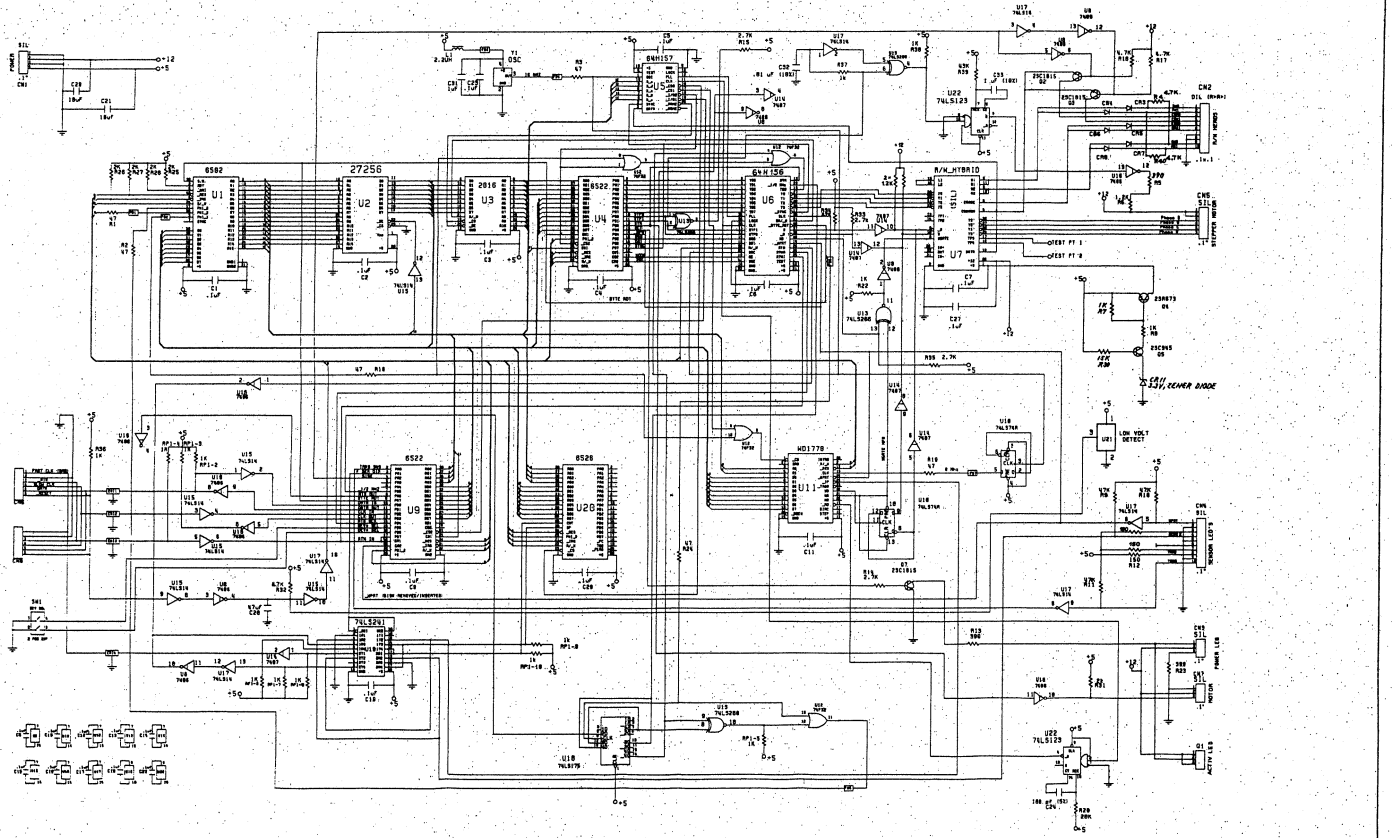
DISK DRIVE
1570/1571 - 1571 CR

Technical Manual

9/87

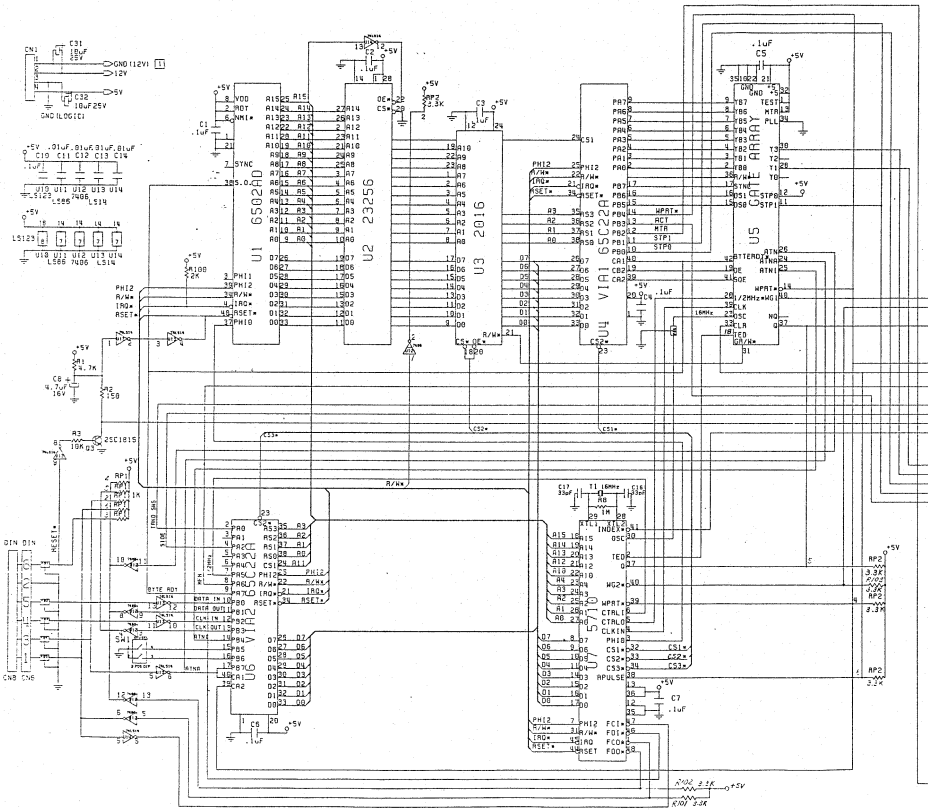
Dier
Lau
Krämer

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE	APPROVED
1		ENGINEERING RELEASE	12-20-85	



	BERLIN 1585	COMMODORE	
	SCHEMATIC 1570 STAND ALONE DISK DRIVE		
	340010	D 325197	REV 1
	SCALE	SHEET 1 OF 1	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	2	ADVANCED_ENGINEERING_RELEASE	6-9-86	M. Rabinowitz
	3	PILOT PRODUCTION RELEASE	1-6-87	[illegible]
	4	REVISED PER ECO 870123	4-23-87	[illegible]



DRAWN BY: M. Kouzel	DATE 01-07-86	COMMODORE	
CHKD: Nishizaki	01-08-86		
ENGR:		SCHEMATIC 1571 CR DISK	
APPR:			
USED ON: 1571 CR	NEXT ASSY	SIZE D	252305 REV 3
		SCALE NONE	SHEET 1 OF 1

QUANTITY REQD PER PART/DASH NO. 01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
	1						
REF	2	D	252305-01	SCHEMATIC, C-1571CR			
1	3	B	252306-01	PCB, FABRICATION			
REF	4	B	252307-01	PCB, ARTWORK			
	5						
	6						
1	7	B	901435-02	I C, CPU 6502-AD	U1		
2	8	B	901477-02	VIA (6522A	U4,6		
	9						
1	10	B	252371-01	FDC 5710	U7		
1	11	B&D	251828-01	GATE ARRAY, 40 PIN	U5		
S	12	B&D	251828-02	GATE ARRAY, 42 PIN	U5		SUBSTITUTE FOR ITEM 11.
	13						
1	14		318047-01	1571CR DOS 256K ROM	U2		Tacc < 300,
1	15	B	251637-05	I C, 2016 (16K S-RAM)	U3		Tacc < 200
	16						
	17						
	18						
1	19	B	252308-01	I C, FDD READ/WRITE AMP	U8		SONY
S	20	B	252308-02	I C, FDD READ/WRITE AMP	U8		MOTOROLA, SUBSTITUTE FOR ITEM 19
	21						
	22						
	23						
1	24	B	901522-06	I C, 7406	U12		
2	25		901521-30	I C, 7410	U13, 14		
1	26		-32	74LS86	U11		
1	27	B	901521-49	I C, 74LS123	U10		
	28						
	29						
	30						
1	31	B	251871-01	I C, UPA2003C	U9		NEC
S	32	B	251871-02	I C, IR2C19	U9		SHARP, SUBSTITUTE FOR ITEM 31.
	33						
	34						
2	35	A	902693-01	TRANSISTOR, 2SC1815	Q2, 3		
S	36	A	310657-01	TRANSISTOR, MPSH51	Q1		SUB FOR ITEM 37
1	37		252460-01	TRANSISTOR, 2SA683	Q1		
S	38		252460-02	TRANSISTOR, 2SA684	Q1		SUB FOR ITEM 37

commodore

TITLE: PCB ASSY, C-1571CR

DRAWN BY: S. Ogawara DATE: 2-20-86
CHKD: [illegible] 3-20-86
ENGR: S. Kasagawa DATE: 4-17-86
APPR: [illegible] 5/7/86

SIZE: B DRAWING NUMBER: 250470 REV: 4
SHEET 2 OF 5

PART NO.	DESCRIPTION
250470-01	PCB ASSY, C-1571CR

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROV'L
#1				
2		ADVANCED ENGINEERING RELEASE	6-19-86	
3		PILOT PRODUCTION RELEASE	10-22-86	
4		REVISED PER ECO 870207 & 870228	7-13-87	

1. SHEET OF SIZE
ASSY DWG
NOTES-UNLESS OTHERWISE SPECIFIED:

commodore	TITLE: PCB ASSY, C-1571CR	DRAWN BY: J. Dyawara	DATE: 2-20-86	ENGR: [illegible]	DATE: 3-21-86	SIZE: B	DRAWING NUMBER: 250470	
		CHKD: [illegible]	3-20-86	APPR: [illegible]	2-17-87		SHEET 1 OF 5	

QUANTITY REQD PER PART/DASH NO. 01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
5	77	B	900461-28	CAPACITOR, CERAMIC, 0.1μF 50V Ⓐ	C21,23,24,		C26,27,33,34 SUB. FOR ITEM 89
2	78	B	251069-10	CAPACITOR, CERAMIC, 1500pF 50V 10% Ⓐ	C25		
5	79		900461-04	1000pF	C18		SUB. FOR ITEM 80
2	80		900010-23	1000pF 10% Ⓡ	C19, 18		
2	81		251072-16	33pF 5% Ⓡ	C16, 17		
4	82		900010-01	.01μF 50V Ⓡ	C11-14		
5	83		900010-12	CERAMIC, .1μF 16V Ⓡ	C1-7, 10		SUB. FOR ITEM 89
1	84	B	900410-04	TANTAL, 1μF 16V 20% Ⓡ	C30		
3	85	A	900100-11	ELECT, 4.7μF 25V Ⓡ	C8, 9, 15		
2	86	A	900100-01	CAPACITOR, ELECT, 10μF 25V Ⓡ	C31, 32		
2	87	B	252370-01	CAPACITOR, ELECT, NON POLE 1μF 50V Ⓡ	C40, 41		
5	88	B	252174-05	CAPACITOR, CERAMIC, 1000pF Ⓡ	C19		SUBSTITUTE FOR ITEM 80
15	89	B	900010-61	CAPACITOR, CERAMIC, 0.1μF 50V	C1-7, 10, 21, 23, 24, 26, 27, 33, 34		
3	90	B	252369-39	COIL, INDUCTOR, 330μH	L1-3		
5	91	B	900402-13	CAPACITOR, TANTAL, 1μF 35V 10% Ⓡ	C30		SUBSTITUTE FOR ITEM 84
5	92	B	252174-07	CAPACITOR, CERAMIC, .01μF 50V Ⓡ	C11-14		SUBSTITUTE FOR ITEM 82
6	93	B	252173-01	FERRITE BEADS Ⓡ	FB1-6		
1	94	B	251069-20	CAPACITOR, CERAMIC, .01μF B, 50V Ⓡ	C20		
5	95		900461-06	CAPACITOR, CERAMIC, 1500P 50V	C25		SUB. FOR ITEM 78
1	96	B	252105-01	HEADER ASSY, 10 PIN (DIL)	CN2		(GOLD FINISH)
1	97		328562-10	10 PIN (SIL)	CN4		
1	98		-06	6 PIN (SIL)	CN5		
1	99		-04	4 PIN (SIL)	CN1		
2	100	B	328562-03	HEADER ASSY, 3 PIN (SIL)	CN3, 7		
	101						
	102						
2	103	B	252166-01	CONNECTOR, 6 PIN DIN	CN6, 8		
	104						
5	105		252173-03	FERRITE BEADS	FB1-6		SUB. FOR ITEM 93
	106						
1	107	B	252144-02	DIP SWITCH 2-BITS (UPRIGHT)	SW1		
	108						
	109						
1	110	B	251313-02	SOCKET, IC LOW-PROFILE 40 PIN	U7		
1	111	B	900150-05	SOCKET, IC LOW-PROFILE 28 PIN	U2		
1	112	B	252076-01	TUBE, INSULATION L=5			WHEN USE ITEM 36

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TITLE: PCB ASSY, C-1571 CR

DRAWN BY: J. Ogawara — DATE: 2-27-86
CHKD: [illegible] — DATE: 3-20-86
ENGR: [illegible] — DATE: 3-18-86
APPR: [illegible] — DATE: 3-17-86

SIZE: B — DRAWING NUMBER: 250470 — SHEET 8 OF 5 — REV: 4

QUANTITY REQD PER PART/DASH NO. 01	ITEM	OS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
	39						
2	40	B	9000850-16	DIODE, 1N916	CR2, 3		
1	41	A	900750-02	DIODE, 1N4002	CR1		
	42						
	43						
1	44	B	900557-01	CRYSTAL, 16 MHZ	Y1		
	45						
	46						
2	47	B	901550-09	RESISTOR, 150 1/4W 5% (A)	R2, 29		
2	48		-20	10K (A)	R3, 26		
	49						
1	50		-53	2K (A)	R100		
1	51		-07	6.2K (A)	R7		
1	52		-04	1M (A)	R8		
3	53		-19	4.7K (A)	R1, 10, 21		
2	54		-60	620 (A)	R11, 12		
1	55		-06	33K (A)	R13		
1	56		-30	560 (A)	R14		
2	57		-57	390 (A)	R22, 23		
1	58		-18	2.2K (A)	R25		
3	59		-01	1K (A)	R27, 33, 34		
3	60		-22	47K (A)	R28, 31, 30		
3	61		-02	3.3K (A)	R101, 102, 103		
1	62	B	901550-99	RESISTOR, 49K 1/4W 5% (A)	R32		
1	63	B	901550-85	RESISTOR, 2.9K 1/4W 5%	R17		
	64						
1	65	B	-21	RESISTOR, CARBON, 39K 1/4W 5% (A)	R16		
	66						
1	67	B	-39	RESISTOR, CARBON, 3.9K 1/4W 5% (A)	R18		
1	68	B	901550-29	RESISTOR, 240 1/4W 5% (A)	R20		
	69						
	70						
1	71	B	901600-37	RESISTOR, 390 1/2W 5% (A)	R24		
	72						
	73						
1	74	A	356190-02	RESISTOR PACK, 1K 1/8W 10%, 6 PIN	RP1		
1	75	A	902442-29	RESISTOR PACK, 3.3K 1/8W 5%, 8 PIN	RP2		
	76						

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TITLE: PCB ASSY, C-1571 CR

DRAWN BY: S. Ogawara — DATE: 2-20-86
CHKD: [illegible] — DATE: 3-20-86
ENGR: S. LaGuyer — DATE: 4-10-86
APPR: [illegible] — DATE: 5/1/86

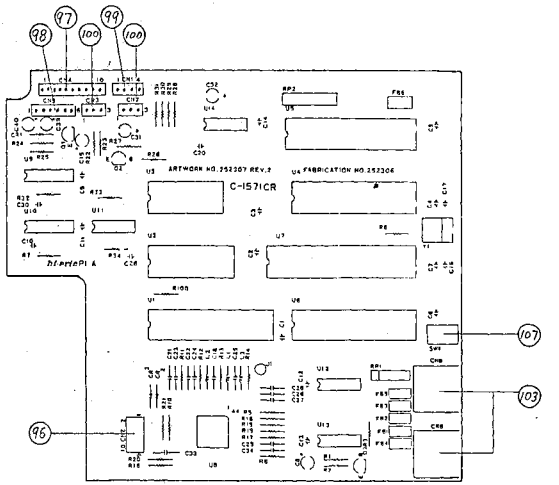
SIZE: B

DRAWING NUMBER: 250470

SHEET 3 OF 5

REV: 4

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		



UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS X .1 XX .01 XXX .005 ∠ .5°	DRAWN BY: [illegible] DATE: 6-6-87	commodore	
	CHKD: [illegible] 6-12-87	PCB ASSY, C-1571CR	
	ENGR: [illegible] 6-11-87		
	APPR: [illegible] 6-24-87		
MATERIAL:	USED ON / NEXT ASSY	SIZE B 250470	REV 4
FINISH:		SCALE NONE	SHEET 5 OF 5

THIRD ANGLE SYSTEM DIMENSION mm